



ABSTRACT

Surgical correction of total anomalous pulmonary venous connection (TAPVC) remains a complex procedure.

This retrospective cohort study aimed to evaluate and compare the outcomes between sutureless and conventional techniques for primary TAPVC repair in single center in Saudi Arabia



CONTACT



A Decade Of Experience With Total Anomalous Pulmonary Venous Connection Repair In Saudi Arabia: Conventional Vs. Sutureless Techniques

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INTRODUCTION

Total anomalous pulmonary venous connection (TAPVC) remains one of the most challenging congenital cardiac anomalies to repair, particularly in the presence of preoperative pulmonary venous obstruction (pre-PVO). Despite advances in surgical techniques, there remains a critical professional practice gap regarding the optimal approach to primary TAPVC repair. Specifically, uncertainty persists over the comparative effectiveness of the sutureless versus conventional techniques, especially in high-risk populations with pre-PVO.

Additionally, there is a lack of consistent risk stratification strategies to predict mortality and postoperative pulmonary venous obstruction (post-PVO). Emerging evidence suggests that preoperative pulmonary vein stenosis scores may offer a valuable prognostic tool, yet their integration into clinical decision-making remains underutilized. Long-term survival outcomes associated with different surgical approaches are also insufficiently reported in the literature, limiting our ability to tailor interventions for durable success.

This study addresses these gaps by presenting a decade of single-center experience in Saudi Arabia, comparing sutureless and conventional TAPVC repair techniques. Through propensity-matched analysis, we evaluate survival and post-PVO outcomes while examining the prognostic significance of pulmonary vein stenosis scores. The results aim to enhance surgical competence, refine perioperative decision-making, and ultimately improve patient outcomes by guiding personalized, evidence-based strategies in TAPVC management.

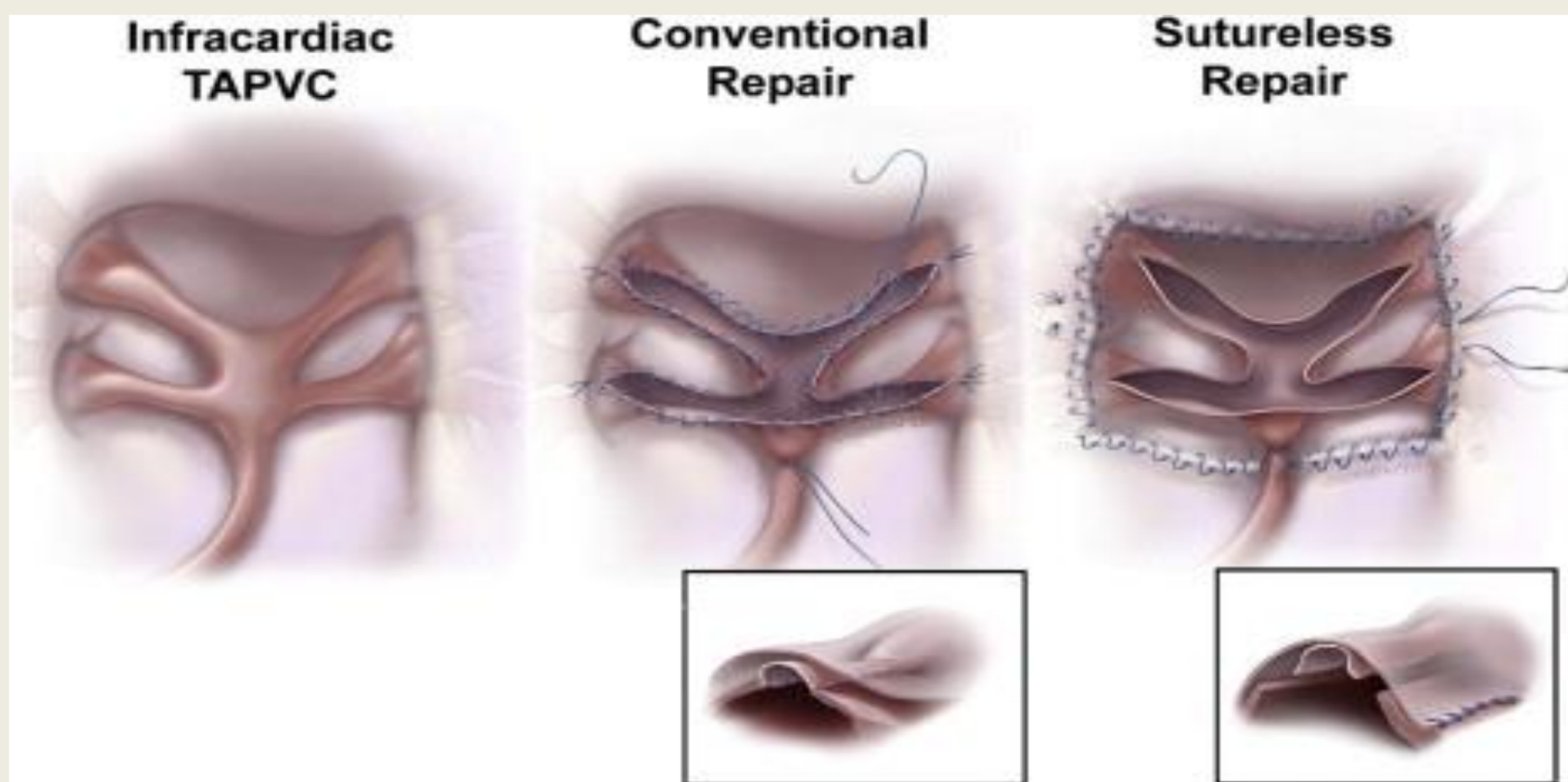
PATIENTS AND METHODS

Between September 2010 and December 2023; 73 consecutive patients underwent TAPVC repair (sutureless, n = 33; conventional, n = 40)

Propensity score matching was used to stratify 58 patients based on the presence or absence of preoperative pulmonary venous obstruction (pre-PVO).

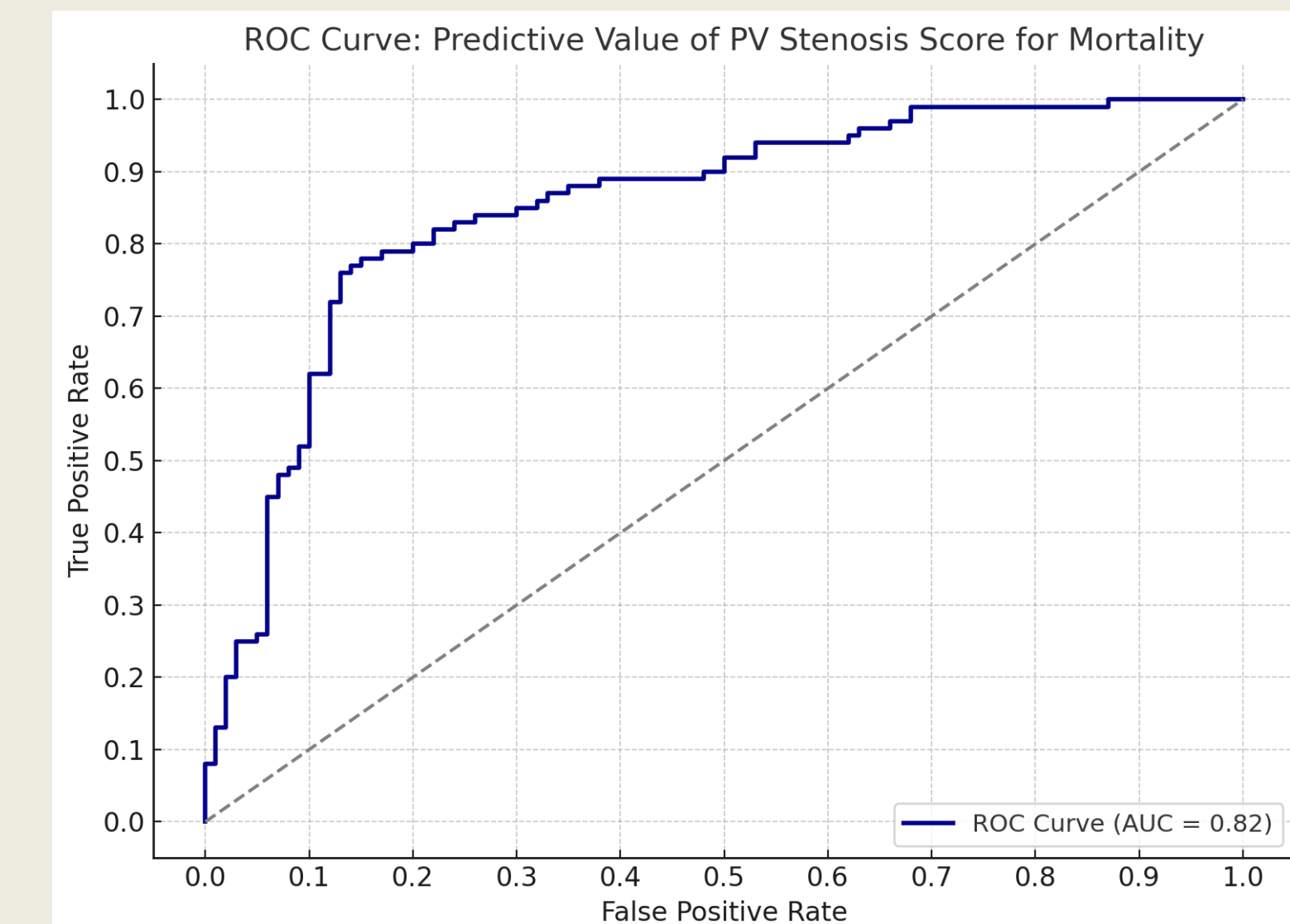
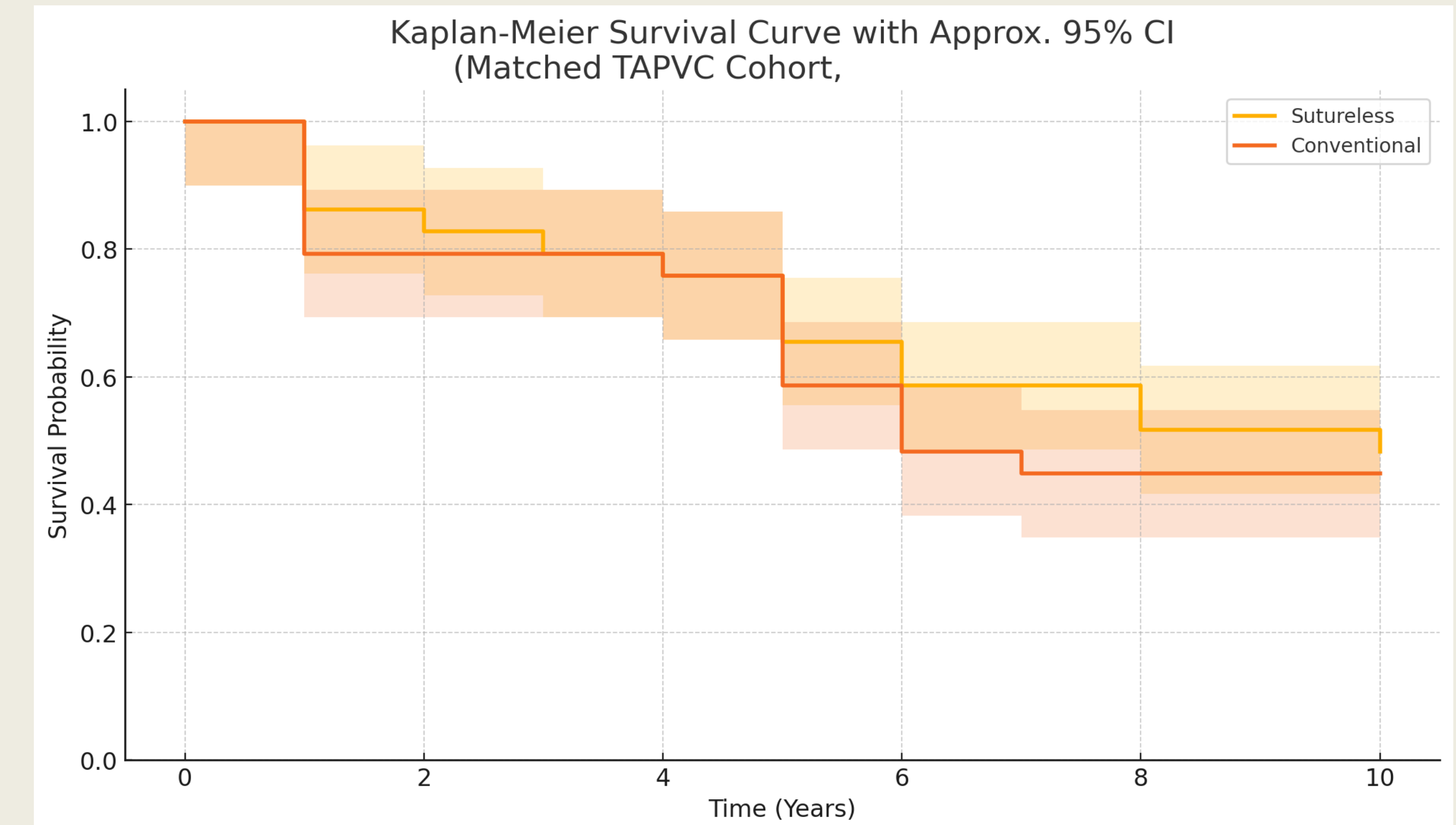
RESULTS

- Freedom from mortality and postoperative pulmonary venous obstruction (post-PVO) were analyzed using Kaplan-Meier curves, while risk factors for death and post-PVO were assessed with a Cox proportional hazard model.
- After matching, Kaplan-Meier analysis revealed that in patients with pre-PVO (n = 16), freedom from death and post-PVO at 1 year was 79% (59.8%-100.0%) in the sutureless group, significantly higher than the conventional group at 36.4% (15.2%-61.4%) (**P = 0.02**).
- For patients without pre-PVO (n = 42), 1-year freedom from death and post-PVO was 95.2% (90.8%-100.0%) in the sutureless group and 83.6% (76.5%-96.9%) in the conventional group (P = 0.15 NS).
- Overall survival rates in the sutureless group were 87.1%, 64%, and 47% at 1, 5, and 10 years, respectively. The conventional technique was identified as a risk factor for mortality (hazard ratio = 4.14, 95% CI: 1.29-13.28), with 7 deaths (17.5%) recorded in this group.
- Conventional technique was also a risk factor for post-PVO (hazard ratio = 5.56, 95% CI: 1.18-26.27), adjusted for TAPVC type, pre-PVO, and other variables. Surgical repair resulted in a significant reduction in total pulmonary vein stenosis score (from 5.2 ± 2.30 preoperatively to 2.4 ± 2.62 postoperatively, **P = 0.005**).
- The preoperative pulmonary vein stenosis score was an independent predictor of mortality (**hazard ratio 1.627, P < 0.01**), with scores greater than 4 indicating a poor prognosis (area under the curve = 0.82).



The sutureless repair for pulmonary veins namely, the creation of a neo-LA by anastomosing the LA wall to the posterior pericardium rather than to the PV tissue itself was initially used for recurrent PVO.

Score	Echo 2D Stenosis	Doppler gradient (Mean - mmHg)	Operative Findings (Macroscopic)	Pathology (Microscopic)
0	None	< 2	Normal Appearance	
1	Mild to Mod	< 5-6	3-4 mm	
2	Severe	> 7	< 2 mm	
3	Occlusion	None	No Lumen	



CONCLUSION

The sutureless approach for primary TAPVC repair is both safe and effective. In patients with pre-PVO, it is associated with significantly reduced mortality and post-PVO.